Periscope.

UNDER THE DIRECTION OF

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PHILOSOPHICAL.

Gehirn und Seele (Brain and Soul). By Prof. A. Forel (*Wiener Medizinische Presse*, 1894, No. 40). Paper read at the second general session of the sixty-sixth gathering of German naturalists and physicians in Vienna.

The purpose of this paper is, to give a clearer definition of the conceptions, mind, soul and consciousness; to demonstrate the intimate relationship existing between (human) soul, consciousness, subject matter of consciousness, brain activity and living brain matter, etc.; a relationship so close as to show that these components are inseparable from one another. We cannot conceive (human) soul without brain activity, consciousness without subject matter of consciousness (Bewustseinsinhalt) subject matter (human) of consciousness without brain activity, etc.

"There is no brain without soul, and no complicated soul analgous to ours without brain; no matter without force, no force without matter."

In arguing these points the author wishes to bring about a reconciliation between religion and science. On the side of religion the mistake was made to have set up finite idols in the place of an infinite God, representing a true and unfathomable metaphysical omnipotence. On the other side science has gone too far. She has forgotten that her pretended (nominal) laws are not fundamental laws but only detailed expressions (detail. verhältnisse) of the unfathomable monistic divine universe. She has also put up materialistic idols which are no better than the religious dogmata derided by her. The highest ideals of humanity: Philosophy, religion, science, ethics and æsthetics ought to co-operate in harmony. The physician should not so bury himself in his special branch of knowledge as to become quite one-sided and to lose the connection that binds medicine to the other great branches of human thought. He ought to study philosophy, he ought to become less materialistic.

The author then passes over to a discussion of the fundamental principles underlying the conceptions of soul and consciousness. The idea of soul includes within itself the conception of consciousness. The latter without the subject matter of consciousness, is inconceivable. We can only become conscious of changes and of relations between things when an increasing activity which must underly consciousness is present. (Ein still bleibendes Bewnsstsein schwindet sehr bald). Accordingly there must be a constant change of the contents of consciousness.

Consciousness has been compared to a mirror in which brain-activity reflects itself; it is more correct however to compare it to the process of reflection instead of to the mirror itself. The latter owes its effects to its reflecting properties, and the "conditio sine qua non" of reflection is a something to be reflected. In the same manner consciousness is inconceivable without contents of consciousness.

In defining consciousness we must do so in a logical manner. The subject matter of consciousness is constantly changing and it is wrong to add to its meaning things of which we were conscious before, but not at the given moment. The attempt to define the conditions under which consciousness arises has been labor lost, as one cannot prove that any activity of the world is unconscious.

It we include under the conception of soul the whole subject matter of the present consciousness, and all that which the ego was once conscious of, the soul must be defined as the sum of all brain activity as it appears in the light of our known inner reflection of consciousness (Bewusstseinsspiegelung). If we choose to further add (to its meaning) all the unconscious nerve activities, the conception of soul becomes still greater. At any rate it becomes evident how the conceptions of soul and of nerve activity amalgamate themselves. Our human brain-soul is, however, only a component phenomenon of the universe. It is divine like the universe but not something higher than all other phenomena of the world. It must be admitted that it is the most complicated and highest of the world phenomena, but its organ, the brain, is also the most complicated and highest developed organization of world-matter known to us, so that in this respect as in others, there is no disproportion between brain and soul.

F. then gives a review of the neuron theory and of our knowledge of brain localization, and characterizes nerve activity in the following manner: A special property of the nervous system is the power of its elements to transmit received impulses rapidly to other elements by an undulating (wellenartige) molecular motion. He proposes to call this motion *neurocym* (Nervenwelle) and to speak of nerve activity as of neurocym activity, The latter may be:

1st, *reproductive*; that is, it may repeat old activities, which by innumerable repetitions have become automatic.

2d, *plastic*, that is, innovating and combining, new combinations: new "neurocym chains" being formed, chiefly by new sensory stimuli. This process is accompanied by subjective and no doubt also objective effort. This we call attention and it is especially prominent in the "reflection of consciousness" (Bewusstseinsspiegelung).

Purely automatic, reproductive neurocym activities can be inherited as such and in toto. Our sensory stimulus is sufficient to evolve a whole "chain" of such activities. This is illustrated by the immediate jumping about and skilful picking of grains of the newly-hatched chicken.

Thus we see that the same process of automatism can be reached in two ways, viz., by inheritance in the course of generations, or by habit (repetition) in the course of one individual life.

Complicated automatisms (instincts) can be accomplished with very few nerve elements (complicated instincts of ants who have relatively a large but absolutely a very small brain).

The study of phylogenetic evolution in animal biology confers upon us the conviction that primary nerve activity is plastic, but that when only a small number of nerve elements are present it leads to the formation of one-sided automatisms. But however this may be, the fact is, that these two activities, the reproductive (automatic) and the plastic, differ only relatively; and we can study the gradual transition of the one (plastic) into the other (reproductive) when we learn something that is new to us. The highest plastic activities are: The plastic imagination, the deliberating reason (judgment), and the higher ethic and æsthetic feelings.

In continuing his arguments the author analyzes in detail the meaning of the conception of consciousness. Attention is called to the fact that in hypnotized persons, we can eliminate whole "psychical chains" from conscious remembrance and that *vice versa* they can be made conscious of things of which they were unconscious at the moment of their occurrence. The facts of double personality and of the special state of consciousness which accompanies dreams are further pointed out. This shows us that the expressions "conscious" and "unconscious" are "evidently founded upon erroneous conceptions." What appears as "unconscious" is frequently only detached from the chain of conscious remembrance. We must conclude, therefore, that there are as many "reflections of consciousness" as there are series of neurocym activities, sufficiently separated functionally or anatomically. We must therefore ascribe subordinate "reflections of consciousness," unknown to us, not only to our cerebrum but to all other departments of the nervous system. This leads to the conclusion that consciousness is evidently a general quality (property) of all living neurons, and also of the nervous systems of animals.

Plants have no nervous system, no neurons; here each cell is independent and represents more an individual of its own than a part of the plant. In speaking of a soul here we must ascribe it rather to the individual cell than to the whole plant.

At this point we have reached the limit of our knowledge. We do not know whether organized beings originate from unorganic substance, or whether life has arisen from physico-chemical processes. But the hypothesis that this is so, seems very probable. Again, the recent investigations in physics and chemistry point more and more to the view that the various forces (electricity, light, heat, etc.) and the various "elements" are actually diversifications of *one* original dynamic and material unity, of *one* primary *potency* (Urpotenz). If the hypothesis that organized life originated from unorganic matter is correct, it follows that all primary properties (Ureigenschafter) of organized living beings (Lebenswesens) consequently, matter and force must be present in unorganic nature. This would imply a general potential animation (Beseelung) of the universe which brings us back to the monistic idea of God.

But of course the "soul embryo" of an organic cell or of an atom cannot possess the complicated associated subject matter of consciousness which the soul of a large brain with its innumerable neurons possesses. There is no great quantitative and qualitative disproportion, however, between the human soul and the soul of animals. Plastic neurocym activity can be proven even in insects. Lubbock has tamed a wasp, Forel a swimming bug.

The higher mammalia are constantly undergoing experiences from which they profit, and in consequence of which they instruct the young to a certain degree. Intimate knowledge of animals makes us recognize individual characters in many of them. We find heroes among the individuals of the animal species; there are aristocrats and proletarians among dogs and horses, etc.

The more closely we study the subject the more vague does the distinction between the human soul and the soul of animals, especially of the higher types, grow, and it is absolutely wrong to speak of the animals as *automats* in contrast to man as a being possessed with a soul.

It is impossible to do this paper proper justice even in a lengthy abstract; details must be read in the original which is highly worthy of study. The views displayed, although startling, are based upon sound foundations. The author presents himself as a philosopher, investigator and pathologist. In his philosophical views we can perceive the influence of Herbert Spencer, whose system of philosophy seems to be in harmony with the author's mode of thinking, and in intimate touch with the progress of positive science.

F's contribution to the knowledge of the finer organization of the nervous system is very extensive. His name is *involuntarily* associated with that of Gudden, in view of the amount of work he did with Gudden's method and his enthusiastic efforts to secure the recognition of its merits. It will also be remembered that Forel was one of the first, if not the first, to excite the interest of the profession for Golgi's discoveries; but he was also the first who established the contact theory of the neurons (which is now gaining more and more ground) in opposition to Golgi's anastomosis-theory. The newly acquired anatomical and physiological facts upon which the writer bases his deductions are to no small extent products of his own work. In latter years the author's endeavors have taken another direction; he has devoted himself chiefly to the study of the phenomena of hypnotism and has greatly enriched science also in this field. It is one of his characteristics to stand up for his convictions even at the risk of being misunderstood and derided. This has shown itself in his stand on the hypnotic question. He has made his influence felt in spite of the opposition met with. He has at any rate convinced us what an important element suggestion forms in therapeutics of any form, and has done a great deal to further our psychological conceptions. This fact becomes evident when we read the paragraph (of his paper) which treats on the various states of consciousness and on consciousness in general. His extreme views on this point which would have appeared quite unnatural a decade or two ago, lose their strangeness in the light of the new knowledge gained.

In conclusion, it may be said that the author has managed the difficult subject of his paper in a masterful manner. His views may perhaps not all be accepted, but we cannot help being impressed by their originality. At any rate, there is enough in them to give ample material for earnest thought and study. Whether right or wrong Forel has the power of making himself felt of exciting interest even where he may excite opposition. ONUF.